mum thermometer here was 36° and grass and plantain leaves were frosted stiff, also asparagus was hurt some; beans, muskmelon, cucumber, and other garden truck were not injured whatever. But 4 miles east of my place, on the farm of Ed. S. Correll just west of the village of Middle Branch, a strange phenomenon occurred.

In a field of corn, about 6 inches high, two rows of corn around the outside of the field were practically destroyed by the frost; rest of field not injured. There is an old worm rail fence on the east side of the field and near this frost was worst; there is no fence on one side adjoining the oats; on another side a picket fence; the other a wire fence. Besides, across the road from this, were sixteen rows of corn about 18 inches high. This was frozen so it has become bleached, and whether it will recover is hard to tell until later. On this farm the thermometer was also 36°, Mr. Correll informs me. This farm is not perhaps quite so high above sea level as my place, but this corn is not growing in any depression. The whole farm is about at the same level, and surrounding farms are mostly at the same level. There was some frost damage in low places in other parts of this township (Plain) which I can understand, and I know that there are frost lines on higher or lower ground or different elevations, but such as this occurring on the farm of Mr. Correll I have never heard of before. Some information regarding this phenomenon, if anything on record in the history of the Weather Bureau, would be much appreciated; and if nothing on record as cause, etc., I believe it would be advisable for you to see the place and investigate the matter for the benefit of the service. If the damage does not show up in our crops more than now visible it was the queerest frost ever experienced in this section.

Yours, respectfully, CLAYTON HOLL.

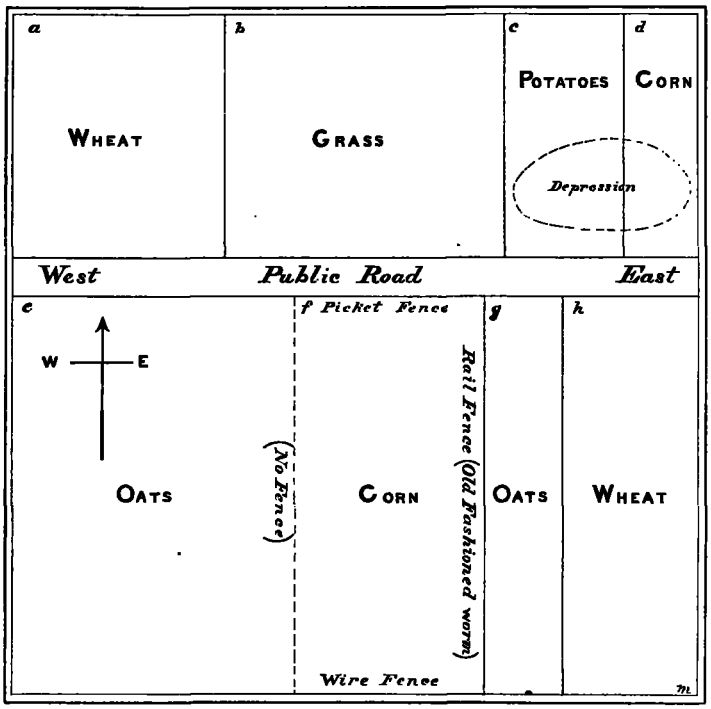

FIG. 1.—Diagram showing fields where peculiar frost damage occurred. *a*, 12 acres of wheat; *b*, 26 acres of grass; *c*, 35 rows (2½ acres) of potatoes; *d*, 16 rows of corn; in the depression indicated the corn and potatoes were badly damaged; *e*, 16 acres of oats, slightly higher than the corn when the frost occurred; *f*, 10 acres of corn; in this cornfield there was damage to about two rows around the outside, a little the worst along the rail fence on the east side; the corn was about 6 inches high when frosted; *g*, 4 acres of oats; *h*, 7 acres of wheat.

NEW BERLIN, OHIO, *June 27, 1908.*

Mr. J. WARREN SMITH,
Section Director, Columbus, Ohio.

DEAR SIR: I have to-day visited Mr. Correll's farm and have made a plat (fig. 1), rather roughly, but you will get some idea at least. This farm is mostly level and not particularly lower than surrounding farms. On the corn plot mostly damaged there is a slight hollow, possibly 8 or 10 feet lower in lowest place than other parts of corn plot, and there the corn will hardly recover to make a crop, while other parts will make possibly a full crop. There is also a farm nearly 1 mile south of Mr. Correll's place, where about 1½ acres of potatoes were nearly one foot high when frosted, and by appearance to-day will not make a crop; otherwise nothing seems to be damaged on this place. There were also in the village of Middle Branch, on several lots, a few sweet potato plants frozen, while those on adjoining lots were perhaps not touched. All this country surrounding is comparatively level and there is not much difference in the soil. The 16 rows of corn [on Mr. Correll's place] grew very fast and therefore may have been more tender than smaller corn, being on rich ground and some fertilizer being used, and planted the second week of May.

I believe this answers your questions, and perhaps when you hear from Washington we may get further information. For as low as the thermometer registered, it was the queerest frost ever experienced in this section in my lifetime of 50 years.

Yours, respectfully, CLAYTON HOLL.

Comment by J. Warren Smith, Section Director, dated Columbus, Ohio, July 18, 1908:

Mr. Holl says that the 16 rows of corn had grown very fast, being on rich soil and well fertilized, and therefore might have been more tender than smaller corn, but he cannot understand the reason for the injury to the two rows around the outside edge of the 10-acre lot.

An area of high barometric pressure lay over the northeast on the night of the 15th and there was a slight air movement across the State from the east or northeast. It is my opinion that the rail fence on the east and the picket fence on the north of this field served as sufficient wind-breaks to hold the air nearly still for a few feet close to the fences. This still air got colder than the surrounding moving air by the loss of its heat to the plants that were in turn cooled by radiation, thus the still air just past the freezing point and frost damage was caused. On the opposite side of the field the oats, being slightly higher than the corn, would also serve as a wind-break and hold a thin layer of air back for a few feet. The damage was not so great on this side as it was next to the rail fence.

In the other cases the damage was probably due to slight differences in elevation, color of the soil, character of the soil, or differences in the frost sustaining power of the plants.

EDITORIAL COMMENT.

The question is as to the injury done by the frost, whether it was due to (1) the tenderness of the plants or (2) the severity of the cold; and in the latter case whether it was due to (*a*) local cold air drainage or (*b*) more intense radiation. It is likely that each of these three causes was respectively responsible for the frost phenomenon in some particular part of the field.

As to the "two rows of corn around the outside edge of the 10-acre lot" nothing less than a careful personal study of this special field would possibly discover the true explanation. It is perfectly possible that on one side cold air drainage from the field to windward; on another side, rich, moist soil and plant tenderness; on the third side, excess of radiation unbalanced by reflection from the fence; on a fourth side, the local drainage of cold air from the field itself down to the "hollow" represented by Mr. Holl in his letter of June 27, 1908, resulted in damage by frost.—*C. A.*

NOTES FROM THE WEATHER BUREAU LIBRARY.

By C. FITZHUGH TALMAN, Librarian.

UPPER AIR OBSERVATIONS IN EGYPT.

At a meeting of the Royal Meteorological Society, London, May 20, 1908, Mr. B. F. E. Keeling, director of the Helwan Observatory (near Cairo) described the upper air observations that are being carried on in Egypt. The Nile flood, upon which the prosperity of all Egypt depends, is controlled by the rainfall of Abyssinia. As but few rainfall reports are obtainable from Abyssinia, where no meteorological service yet exists, it is hoped to make up for this lack of information by observing the upper air over Egypt by means of pilot balloons and kites. One interesting result already attained is the observation of the return trade wind, confirming the observations of Rotch and Teisserenc de Bort over the Atlantic Ocean. At Helwan the return trade is encountered at an altitude of about 6,500 feet. One balloon ascent, of 54,000 feet, appears to have past entirely thru the southwest return trade and to have encountered a northwest current above it.

METEOROLOGY IN PAPUA.

The annual report of the territory of Papua (British New Guinea) for the year ended June 30, 1907, contains the results of meteorological observations at three stations—Port Moresby, Samarai, and Daru—for the period July, 1906–June, 1907, inclusive. The northwest monsoon generally begins at these stations about the end of November and continues until March or April; the southeast trades prevail the rest of the year.

Instruments have been ordered for thirteen additional stations, so there is a prospect that Papua will shortly have a climatological service more nearly commensurate with its agricultural requirements.

METEOROLOGICAL WORK IN THE SOUTH ORKNEYS.

In the Scottish Geographical Magazine for July, 1908, Mr. R. C. Mossman describes the meteorological work carried on at Laurie Island, South Orkneys, (latitude 60° 44′ S, longitude 44° 39′ W.), by the Scotch observers who have entered the service of the Argentine Meteorological Office. The station was established by the *Scotia* Expedition in March, 1903, and since the departure of the *Scotia* in February, 1904, has been maintained by the Argentine Government, at an annual expense of $22,500. Mr. Mossman states that—

> Including the year's observations obtained by the Scottish National Antarctic Expedition, data covering five years are now available. The observations for 1904 are in the press and will be issued immediately, and the detailed values for the following three years will be in type about the end of this year, together with a complete discussion of the material for the whole period. The station on Wandel Island in 65° south, occupied by Doctor Charcot in 1904, will, it is hoped, be reestablished next summer by the Argentine Meteorological Office. The most pressing necessity now is for one or two years' observations at a continental station in from 70° to 74° south, between the meridians of 40° and 70° west. In this way the full value of the meteorological observations at the South Orkneys would be obtained, and the causes of the ebb and flow of the antarctic atmospheric circulation rendered apparent.

Observations are likewise carried on in South Georgia (latitude 54° 14′ S., longitude 36° 33′ W.), and the author presents an abstract of the results at both stations during the year 1907. Some interesting peculiarities of pressure distribution during August, 1907, are noted, which Mr. Mossman ascribes to an unusual extension northward of the "antarctic anticyclone" or permanent high-pressure area over the supposed Antarctic Continent.

THE LATE PRINCE YAMASHINA.

H. I. H. Prince Yamashina, of Japan, died May 2, 1908, in his thirty-second year. He was known to western science chiefly as the founder of an excellent meteorological observatory[1] on the summit of Mount Tsukuba, 65 kilometers northeast of Tokyo, together with a base station and a station at an intermediate altitude. The Prince received a part of his education in Germany, which explains why the results of the observations at his observatory have been published in German, under the title, "Ergebnisse der meteorologischen Beobachtungen auf dem Tsukubasan."

CHANGES AT THE HONGKONG OBSERVATORY.

The latest annual report of the Hongkong Observatory records the retirement in September, 1907, of Dr. W. Doberck, after twenty-four years' service as director. He is succeeded by F. G. Figg, late first assistant. Mr. Figg has been at Hongkong since 1883, having previously served as assistant and magnetic observer at Kew. A new first assistant has been appointed in the person of C. W. Jeffries, formerly at the Royal Observatory, Cape of Good Hope.

DEATH OF DOCTOR CRULS.

Nature (London) announces the death, in Paris, of Dr. Luiz Cruls, director since 1881 of the Observatory of Rio Janeiro. Doctor Cruls was the author of a memoir on the climate of Rio Janeiro. He was, however, probably best known to meteorologists in connection with his unsuccessful efforts, in the latter eighties, to interest meteorological institutions thruout the world in the compilation of a universal climatological dictionary.

NEW OBSERVATORY AT CIENFUEGOS, CUBA.

The director of Belen College Observatory, Havana, writes that a new meteorological and seismological observatory is to be opened shortly at Cienfuegos, under the direction of his assistant, R. S. Sarasola, S. J.

MEETING OF BRITISH METEOROLOGISTS IN CANADA.

The meeting of meteorologists from all parts of the British Empire that was to have been held at Quebec in July of this year, in connection with the tercentenary celebration, has been postponed until 1909.

METEOROLOGY AT THE DRESDEN PHOTOGRAPHIC EXPOSITION.

At the International Photographic Exposition to be held in Dresden in October, 1909, special attention is to be given to scientific photographs, and one of the subsections is to be devoted to meteorology. Besides photographs of interesting meteorological phenomena, exhibits of photographic apparatus for meteorological measurements are desired; also publications relating to meteorological photography. Particulars regarding the meteorological part of the exposition may be obtained from Professor Süring, Nassauische Strasse 16 a, Wilmersdorf bei Berlin, Germany.

AERIAL OBSERVATIONS IN TROPICAL AFRICA.

The Scottish Geographical Magazine for August contains particulars regarding the African expeditions organized in connection with the "international week" of upper air observations arranged for July, 1908. Professor Palazzo, director of the Central Italian Bureau of Meteorology, was to embark at Zanzibar during July on the torpedo cruiser *Caprera*. One object of the expedition was the investigation of the monsoon winds on the coasts and in the interior of East Africa. Simultaneously British, French, and German expeditions were to carry on similar investigations in the subtropical zone of the interior. The German expedition was organized under the immediate patronage of the German Emperor, who contributed 50,000 marks ($12,500) for the purpose of meteorological research on Victoria Nyanza.

THE CLIMATE OF SPOKANE, WASH.

By CHAS. STEWART, Local Forecaster. Dated Spokane, Wash., January, 1908.
[Reprinted from 16th Annual Report, Board of Health of the city of Spokane.]

Spokane is situated in eastern Washington, latitude 47° 40° N., longitude 117° 25′ W., between the Rocky and Cascade mountains, at an elevation of about 1,900 feet above sea level.

The U. S. Weather Bureau office in Spokane was established February 1, 1881, giving up to date, January, 1908, meteorological records for over twenty-six years. In the preparation of the accompanying tables only whole years have been considered, leaving out the years 1881 and part of 1908, thus giving a record for twenty-six years, from 1882 to 1907, both years inclusive.

Owing to limited space, it is not practicable to remark fully upon these tables, and we shall, therefore, simply make a few statements, principally bearing on hygiene.

In comparing climates many people are inclined to be satisfied with a mere knowledge of the mean temperature, extremes of temperature, and perhaps the precipitation, of a place; forgetting that several places may have an equality of temperature in every respect, yet, owing to other important meteorological factors, differ widely as to climate.

The higher temperatures are shown to have risen above 90° each year, rising as high as 104° August 8, 1898; this might lead one unacquainted with the climate of Spokane to suppose

[1] This observatory is described in Monthly Weather Review, October, 1904, XXXII, p. 463.